

**FILE NO.** 9-1001

**DATE:** August 23, 1996

**CODE APPLICATION NOTICE**

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9-1001 Fire-Protection Systems and Equipment

**SUBJECT**

**APPROVAL DATE**

Voltage Drop and Testing

September 21, 2004

Fire Alarm System Plans and Specifications

August 25, 2004

REVISION: September 15, 2004

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## VOLTAGE DROP AND TESTING

**CODE SECTION:** Section 1001.3, Plans ~~for Fire Alarm Systems~~, and Section 1001.4, ~~Approval and Installation Acceptance Testing~~, 1995 2001 California Fire Code, Part 9, Title 24, CCR

**1001.3 Plans ~~for Fire Alarm Systems~~.** Complete plans and specifications for fire alarm systems; fire-extinguishing systems, including automatic sprinklers standpipe systems; clean agent systems and other special types of automatic fire-extinguishing systems; and other fire-protection systems and appurtenances thereto shall be submitted to the fire department for review and approval prior to system installation. Plans and specifications for fire alarm systems shall include, but not be limited to, a floor plan; location of all alarm-initiating and alarm-signaling devices; alarm control- and trouble-signaling equipment; annunciation; power connection; battery calculations; conductor type and sizes; voltage drop calculations; and manufacturer, model numbers and listing information for all equipment, devices and materials, ~~for SFM~~ and State Fire Marshal listing number of all equipment, devices and materials requiring listing.

**1001.4 ~~Approval and Installation Acceptance Testing~~.** Fire alarm systems; fire hydrant systems; fire-extinguishing systems, including automatic sprinklers and wet and dry standpipes; halon systems and other special types of automatic fire-extinguishing systems; basement pipe inlets; and other fire-protection systems and appurtenances thereto shall meet the approval of the fire department as to installation and location and shall be subject to such periodic acceptance tests as required by the chief. ~~See Appendix III-C.~~

Condition of ~~approval~~ acceptance of halon and clean agent systems shall be satisfactory passage of a test conducted in accordance with nationally recognized standards prior to final acceptance of the system.

Fire alarm and detection systems shall be tested in accordance with ~~U.F.C. Standard 10-4 and nationally recognized standards~~ [For SFM] NFPA 72 as amended in Article 91 and California Code of Regulations Title 19.

See Section 9003, Standard n2.8,n2.9,n2.10,n2.11,n2.12.

## INTERPRETATION:

All fire alarm ~~shop~~ drawings submitted for approval shall include calculations ~~intended to demonstrate~~ demonstrating that the voltage drop due to line loss of each notification appliance circuit(s) does not exceed the following level:

1. Ten percent (10%) of the nominal Fire Alarm Control Unit operating voltage as shown on the manufacturer's catalog cut sheets and/or listed installation instructions.

OR

2. The lowest level of notification appliance manufacturer's listed nameplate voltage range, as calculated from the nominal Fire Alarm Control Unit operating voltage.

In addition to the above calculations, as a portion of the field inspection of the fire alarm system installation, the contractor shall demonstrate to the inspector that any or all affected notification appliance circuits as installed meet the above criteria. The test method for such demonstration shall include the following steps:

1. Using a volt-ohm meter set to read the voltage being applied, measure the output voltage of the notification appliance circuit to be tested at the notification circuit power source.
2. Remove from its mounting the end of line notification appliance. All appliance wiring and the end of line devices are to remain intact throughout the test procedure.
3. Activate the fire alarm system to cause the notification appliance circuit to operate.
4. Using a volt-ohm meter, measure the actual voltage being applied to the end of line device during operation of the circuit.
5. Compare the measured voltage to the manufacturer's nameplate voltage. The measured voltage shall not be below the lowest voltage range as printed on the device nameplate. If the output voltage, as measured at the circuit's power source is greater than 24 volts, that difference shall be added to the lowest nameplate voltage of the device and the actual voltage measured at the device shall not be lower than that voltage. Any circuit(s) failing such field tests shall be reevaluated, repaired, and retested prior to acceptance of the system.

#### REASON:

Individual notification appliances are approved and listed by the California State Fire Marshal for a range of operating voltages. However, excessive voltage drops in the notification appliance circuits may cause both audible and visible devices to function outside the required performance parameters of the ~~1995~~ 2001 California Building Code, Part 2, Title 24 and the ~~1995~~ 2001 California Fire Code, Part 9, Title 24.

Low voltage to audible notification devices will cause the device to operate below the minimum decibel levels outlined in Chapter 35, ~~1995~~ 2001 California Building Code, Part 2, Title 24. Low voltage to visible notification devices will cause the device to operate below the minimum flash rate parameters.

ORIGINAL SIGNED

9/21/04

Kurt A. Schaefer

Date

**FIRE ALARM SYSTEM PLANS AND SPECIFICATIONS**

**CODE SECTION:** Section 1001.3, Plans ~~for Fire Alarm Systems~~, 1995 2001 California Fire Code, Part 9, Title 24

**1001.3 Plans ~~for Fire Alarm Systems~~.** Complete plans and specifications for fire alarm systems; fire-extinguishing systems, including automatic sprinklers standpipe systems; clean agent systems and other special types of automatic fire-extinguishing systems; and other fire-protection systems and appurtenances thereto shall be submitted to the fire department for review and approval prior to system installation. Plans and specifications for fire alarm systems shall include, but not be limited to, a floor plan; location of all alarm-initiating and alarm-signaling devices; alarm control- and trouble-signaling equipment; annunciation; power connection; battery calculations; conductor type and sizes; voltage drop calculations; and manufacturer, model numbers and listing information for all equipment, devices and materials, ~~for SFM~~ and ~~State Fire Marshal~~ *listing number of all equipment, devices and materials requiring listing.*

**INTERPRETATION:**

All fire alarm system submittals shall include all of the following information submitted as a package. This shall apply whether the information is submitted with architectural drawings or as a deferred approval item after general plan review.

1. Scope of project
2. Floor plan showing fire alarm devices
3. Riser diagram
4. Point to point diagram
5. California State Fire Marshal listing sheet showing expiration date for all components
6. Manufacturer's specification sheet on all fire alarm equipment
7. O.S.H.P.D. Project number
8. Battery calculation or recalculation
9. Voltage drop calculation or recalculation
10. Accurate legend of symbols for all fire alarm devices being installed
11. Elevation detail of manual pull station installation
12. Elevation detail of visual alarm signaling devices
13. Location of fire/smoke barrier walls on floor plan
14. Identification of type of wiring used, including gauge and wire counts
15. Design number and detail of through penetration firestop system
16. Floor plan showing room identification/use
17. Details on support and anchorage of any fire alarm equipment weighing over 20 pounds
18. Sequence of operation/events when alarm system is activated

**REASON:**

The Section requires the submittal of complete plans and specification for review and approval prior to fire alarm system alterations or installation. This section also specifies, in part, the information necessary to evaluate and approve submitted plans.

This interpretation clarifies the minimum information required by this office to adequately review and evaluate fire alarm submittals. Designers are encouraged to include the minimum 15 item list in either the project specification or on the cover sheet of plan submittals.

ORIGINAL SIGNED

8/25/04

Kurt A. Schaefer

Date